

1. Functional group

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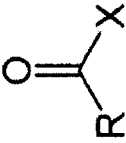
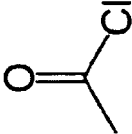
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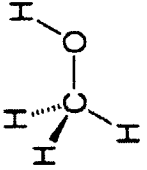
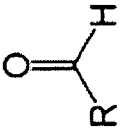
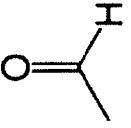

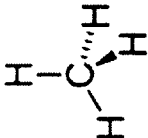
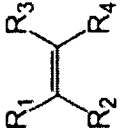
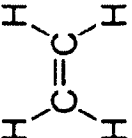
For other uses, see Functional group (disambiguation).

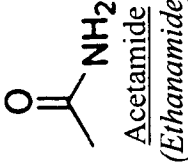
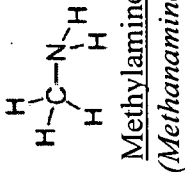
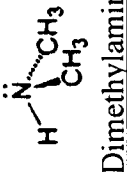
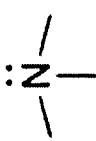
In organic chemistry, **functional groups** are specific groups of atoms within molecules, that are responsible for the characteristic chemical reactions of those molecules. The same functional group will undergo the same or similar chemical reaction(s) regardless of the size of the molecule it is a part of.

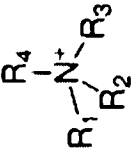

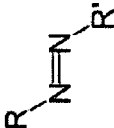


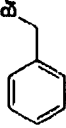

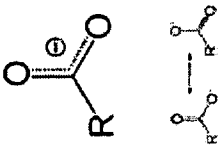
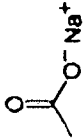
The following is a list of common functional groups. In the formulas, the symbols R and R' usually denotes an attached hydrogen, or a hydrocarbon side chain of any length, but may sometimes refer to any group of atoms. Below is an image of multiple functional groups found in organic chemistry.

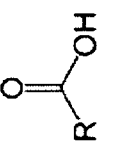
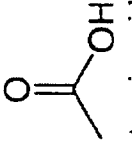
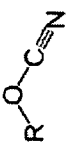
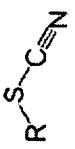
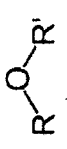

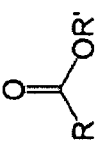
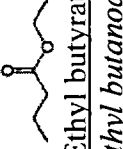

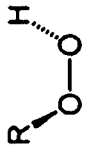
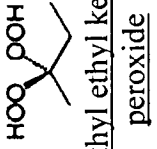
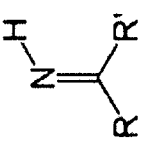
(For convenience, the basic functional groups covered in General Biology are also listed here)

<u>Chemical class</u>	Group	Formula	Graphical Formula	Prefix	Suffix	Example
<u>Acyl halide</u>	Haloformyl	RCOX		haloformyl-	-oyl halide	 <u>Acetyl chloride</u> (<i>Ethanoyl chloride</i>)

<u>Alcohol</u>	<u>Hydroxyl</u>	ROH	$\text{R}-\text{O}-\text{H}$	hydroxy-	-ol	 Methanol
<u>Aldehyde</u>	<u>Aldehyde</u>	RCHO		oxo-	-al	 Acetaldehyde (Ethanal)
<u>Alkane</u>	<u>Alkyl</u>	RH		alkyl-	-ane	 Methane
<u>Alkene</u>	<u>Alkenyl</u>	$\text{R}_2\text{C}=\text{CR}_2$		alkenyl-	-ene	 Ethylene (Ethene)

<u>Alkyne</u>	<u>Alkynyl</u>	$RC \equiv CR'$	$R \text{---} \text{C} \equiv \text{C} \text{---} R'$	alkynyl-	-yne	$H-C \equiv C-H$ <u>Acetylene</u> (<i>Ethyne</i>)
<u>Amide</u>	<u>Carboxamide</u>	$RCONR_2$	$R-C(=O)-N(R')R''$	carboxamido-	-amide	 <u>Acetamide</u> (<i>Ethanamide</i>)
<u>Amines</u>	<u>Primary amine</u>	RNH_2	$R-NH_2$	amino-	-amine	 <u>Methylamine</u> (<i>Methanamine</i>)
	<u>Secondary amine</u>	R_2NH	$R-NH-R'$	amino-	-amine	 <u>Dimethylamine</u>
	<u>Tertiary amine</u>	R_3N	$R-N(R')R''$	amino-	-amine	 <u>Trimethylamine</u>

	<u>4° ammonium ion</u>	R_4N^+		ammonio-	-ammonium	 <u>Choline</u>
<u>Azo compound</u>	<u>Azo</u> (<u>Diimide</u>)	RN_2R'		azo-	-diazene	 <u>Methyl orange</u>
<u>Toluene derivative</u>	<u>Benzyl</u>	$RCH_2C_6H_5$ RBn		benzyl-	1- (<i>substituent</i>)toluene	 <u>Benzyl bromide</u> (<i>1-Bromotoluene</i>)
<u>Carbonate</u>	<u>Carbonate ester</u>	$ROCOOR$			alkyl carbonate	
<u>Carboxylate</u>	<u>Carboxylate</u>	$RCOO^-$		carboxy-	-oate	 <u>Sodium acetate</u> (<i>Sodium ethanoate</i>)

<u>Carboxylic acid</u>	<u>Carboxyl</u>	RCOOH		carboxy-	-oic acid	 Acetic acid (Ethanoic acid)
<u>Cyanates</u>	<u>Cyanate</u>	ROCN		cyanato-	alkyl cyanate	
	<u>Thiocyanate</u>	RSCN		thiocyanato-	alkyl thiocyanate	
<u>Ether</u>	<u>Ether</u>	ROR'		alkoxy-	alkyl alkyl ether	 Diethyl ether (Ethoxyethane)
<u>Ester</u>	<u>Ester</u>	RCOOR'			-oate	 Ethyl butyrate (Ethyl butanoate)
<u>Haloalkane</u>	<u>Halo</u>	RX	$R-X$	halo-	alkyl halide	 Chloroethane (Ethyl chloride)
<u>Hydroperoxide</u>	<u>Hydroperoxy</u>	ROOH		hydroperoxy-	alkyl hydroperoxide	 Methyl ethyl ketone peroxide
<u>Imine</u>	<u>Primary ketimine</u>	RC(=NH)R'		imino-	-imine	

	<u>Secondary ketimine</u>	$RC(=NR)R'$		imino-	-imine	
	<u>Primary aldimine</u>	$RC(=NH)H$		imino-	-imine	
	<u>Secondary aldimine</u>	$RC(=NR')H$		imino-	-imine	
<u>Isocyanide</u>	<u>Isocyanide</u>	RNC	$R-\overset{+}{N}\equiv C^-$	isocyano-	alkyl isocyanide	
<u>Isocyanates</u>	<u>Isocyanate</u>	$RNCO$	$R-N\equiv C=O$	isocyanato-	alkyl isocyanate	
	<u>Isothiocyanate</u>	$RNCS$	$R-N\equiv C=S$	isothiocyanato-	alkyl isothiocyanate	
<u>Ketone</u>	<u>Ketone</u>	$RCOR'$		keto-, oxo-	-one	
<u>Nitrile</u>	<u>Nitrile</u>	RCN	$R-C\equiv N$	cyano-	alkanenitrile alkyl cyanide	